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MOURNING DOVE STATUS REPORT, 1974

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MOURNING DOVE STATUS REPORT, 1974

By James L. Ruos, Compiler

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Compiled by

James L. Ruos

Office of Migratory Bird Management
Patuxent Wildlife Research Center
Laurel, Maryland   20811

Abstract

Mourning dove population indices, as determined from the nationwide Call-Count Survey, decreased from 1973 to 1974 by 3% in the Eastern Management Unit, but increased by 2% in the Central Management Unit, and by 21% in the Western Management Unit. The change in the Western Unit was statistically significant ($P<0.05$). The 1974 indices were below the 10-year means (1964-73) by 11% in the Eastern Unit and 3% in the Central Unit, but 19% above the long-term mean in the Western Unit. Regression analyses of the call-count data for 1964-74 indicate a downward trend in dove breeding populations in all management units; mean rates of annual decline were 2% in the Eastern Unit, 1% in the Central, and 2% in the Western. The trends for the Eastern and Central Units were statistically significant ($P<0.05$). From 1971 to 1974, Western Unit population indices increased by 46%.

Changes in population indices are described by State and physiographic region. The 1974 indices were higher than those in 1973 for over one half of the Nation, notably in the western States, the coastal plain of Texas and Louisiana, and several regions east of the Appalachian Mountains. Lower population indices occurred principally in portions of the north-central and southeastern States. Regression analyses of 11 years' data, 1964-74, showed statistically significant ($P<0.05$) upward population trends in seven States totaling 21% of the Nation's land area. Trends were significantly downward in 16 States that made up 35% of the land area.

Management of mourning doves in the United States involves the regulation of hunting to achieve proper harvest. In setting annual regulations, wildlife administrators rely upon population index data provided by the Call-Count Survey, conducted annually since 1953 by Federal, State, and independent observers. This report describes the methods employed to obtain and analyze these data and presents the status of the breeding population of mourning doves in 1974.

Two versions of the dove status report, one preliminary and one final, are prepared annually. In 1974 the preliminary report was mailed to members of the Dove Regulations Committee a week before the June regulations meeting in Washington, D.C. This timely distribution was made possible because the cooperators sent their data directly to the Office of Migratory Bird Management at Laurel, Maryland, immediately after completing their surveys. The present report is the final version and contains additional analyses of survey data.

Basic procedures for collecting and analyzing data in this report were similar to those used in 1973 (Ruos 1974b). Data reflecting regulatory changes in the nonhunting and hunting status of South Dakota and Wyoming in 1973 are presented for the first time.

Procedures

The Call-Count Survey

Field studies have demonstrated the feasibility of the Call-Count Survey as a method for detecting annual changes in mourning dove breeding populations (Foote and Peters 1952:1-3). Since 1953, these surveys have been conducted throughout the United States on more than 800 established routes. Each call-count route has twenty 3-min listening stations spaced at 1.6-km intervals; the routes are usually on lightly traveled secondary roads.

A survey is conducted on each route once between 20 May and 10 June. Beginning in 1972, cooperators were instructed to run their routes between 20 May and 31 May. An extension to 10 June was provided to cooperators unable to complete their assignments during the desired period. Intensive studies in the eastern United States (Foote and Peters 1952:1-3) indicated that dove calling is relatively stable during the survey period. Call-count surveys are not made when wind velocities exceed 19.3 km/h or when it is raining.

The numbers of doves heard calling during the 3-min listening periods are used for determining the

population index. The number of calls per dove, and of doves seen, are not currently used in the index calculations, although they are recorded on the routes. These supplemental data are being analyzed.

Routes on which no doves were heard or seen for two successive years are identified as Automatic Zero Routes and they continue to be included as zeros in the survey analysis. Once designated, these routes are no longer run annually; however, they are subject to periodic reexamination.

Population indices derived from the Call-Count Survey are believed to be biologically and statistically sound for detecting major year-to-year changes in breeding population levels for management units and for determining long-term population trends for States and management units. However, additional field research is needed to more accurately relate changes in the survey index to changes in the population of mated doves. Specific relationships between calling doves and breeding pairs have been difficult to establish (Stone 1966).

Quality Checks of Field Data

As in previous years, all 1974 survey reports were examined for accuracy, completeness, and data comparability between identical routes run in both the current and preceding years. In this report, indices for years since 1967 have been derived from data meeting the 1972 standardized criteria for quality (Ruos 1974a).

Randomization of Call-Count Routes

The original Call-Count Survey routes, established between 1951 and 1956, were frequently selected in areas of high dove density. These were gradually replaced by more than 900 randomly selected routes between 1957 and 1970 in all 48 conterminous States (Ruos 1972).

Breeding Density Index

The Breeding Density Index (BDI) is the mean number of doves heard calling per route. Before 1966, State indices were represented by unadjusted values. Management unit (Fig. 1) indices, however, were adjusted by the proportional area of dove habitat that each State represented within a management unit. Beginning in 1966, State BDI's were determined from indices within each physiographic region (Fig. 2) weighted by the proportional land area that the region represented within a State. Management unit indices were then obtained from State BDI's adjusted for differences in land area that each State represented within the unit. Current weighting values for States and physiographic regions within management units appear in Tables 3 and 4.
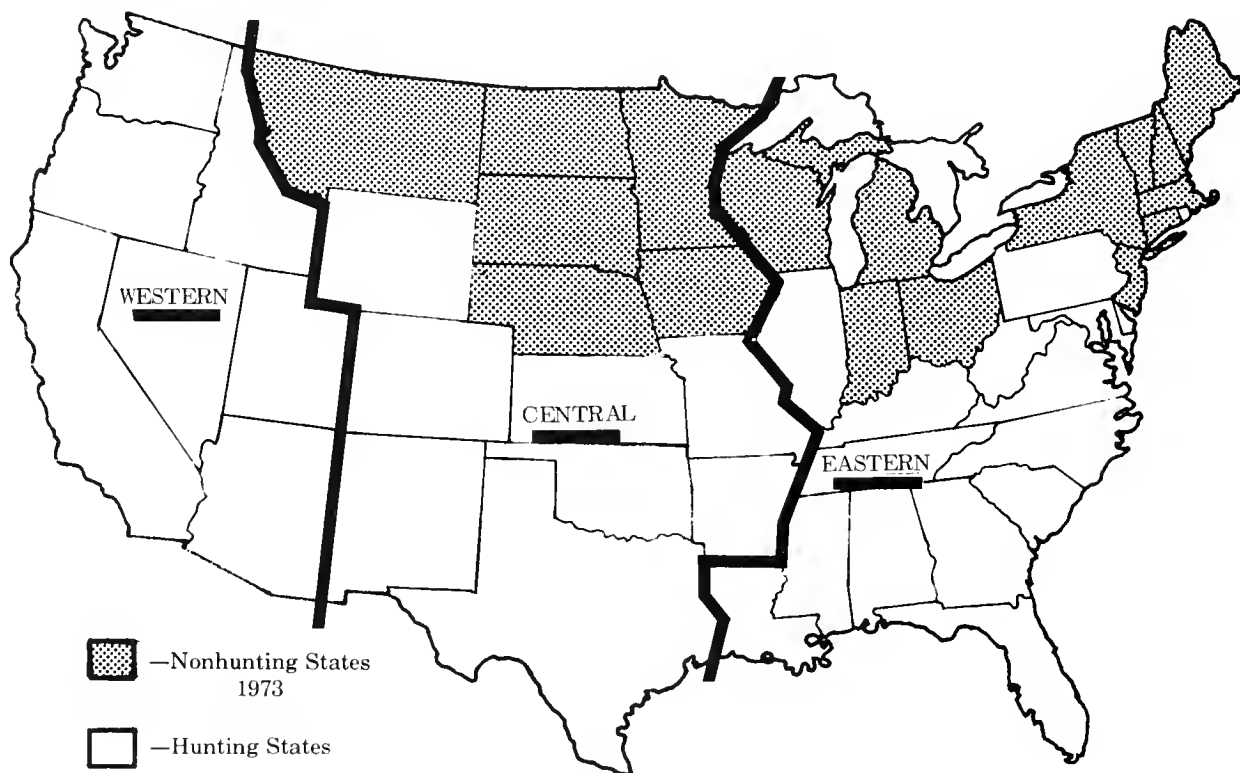

Fig. 1. Mourning dove management units.

Table 1. *Changes in mourning dove breeding density indices on 20-stop call-count survey routes, 1973-74.*

| States | Routes | Mean number of doves heard per route[a] | | | | Percent change[b] |
| | | Adjusted within year | | Adjusted to base year | | |
		1973	1974	1973	1974	
			Eastern Management Unit			
			Hunting States			
Ala.	26	19.0	20.5	17.5	18.8	7.6
Del.	1	14.0	14.0	10.7	10.7	0.0
Fla.	19	10.8	11.3	6.8	7.1	5.1
Ga.	16	25.6	28.6	11.5	12.9	12.0
Ill.	14	20.6	18.2	27.5	24.3	-11.6
Ky.	15	24.7	23.5	27.0	25.7	-4.9
La.	17	5.9	6.4	6.2	6.6	6.8
Md.	7	14.8	15.6	23.8	25.1	5.4
Miss.	19	26.9	27.0	32.5	32.6	0.4
N.C.	17	24.1	16.4	14.8	10.1	-32.0
Pa.	15	7.1	7.1	5.6	5.5	-1.3
R.I.	2	10.0	12.0	2.0	2.4	20.0
S.C.	17	28.7	27.0	33.3	31.3	-6.0
Tenn.	19	22.4	21.7	28.6	27.7	-3.1
Va.	8	18.6	27.0	13.4	19.4	44.9[c]
W. Va.	9	4.1	3.5	5.7	4.9	-14.4
Subtotal	221			17.6	17.5	-0.6
			Nonhunting States			
Conn.	1	1.0	5.0	5.5	27.5	400.0
Ind.	12	33.2	30.0	36.8	33.3	-9.5
Mass.	2	7.0	5.5	6.1	4.8	-21.4
Maine	4	0.0	0.0	0.0	0.0	0.0
Mich.	14	10.8	10.0	11.7	10.8	-7.4
N.H.	3	6.6	3.2	4.4	2.1	-51.9
N.J.	2	21.9	16.4	23.1	17.3	-25.1
N.Y.	11	12.7	10.9	5.7	4.9	-14.4
Ohio	10	25.1	23.3	22.0	20.4	-7.5
Vt.	2	0.0	0.0	0.0	0.0	0.0
Wisc.	19	14.9	11.8	12.5	9.9	-21.1
Subtotal	80			13.6	12.3	-9.9[d]
Total	301			16.2	15.7	-3.1
			Central Management Unit			
			Hunting States			
Ark.	12	22.1	22.5	25.5	26.0	1.8
Colo.	14	13.2	17.2	19.7	25.6	30.0[d]
Kans.	16	53.1	42.6	57.2	45.9	-19.7
Mo.	15	29.8	25.9	29.9	26.0	-12.9
N. Mex.	16	11.8	12.1	4.9	5.0	2.6
Okla.	5	37.2	40.6	42.2	46.1	9.2
Tex.	22	19.4	20.8	18.8	20.2	7.3
Wyo.	11	10.3	13.8	8.9	11.9	33.4[e]
Subtotal	111			22.7	23.1	1.8

Table 1. *Changes in mourning dove breeding density indices on 20-stop call-count survey routes, 1973-74—*
Continued.

| States | Routes | Mean number of doves heard per route[a] | | | | Percent change[b] |
| | | Adjusted within year | | Adjusted to base-year | | |
		1973	1974	1973	1974	
Nonhunting States						
Iowa	13	27.2	23.7	18.2	15.8	-13.2
Minn.	9	4.9	7.6	11.7	18.0	54.2
Mont.	10	7.9	6.0	3.8	2.9	-23.5
N. Dak.	18	28.1	28.0	23.2	23.1	-0.5
Nebr.	20	39.3	38.6	48.6	47.7	-1.9
S. Dak.	16	32.9	34.3	40.5	42.3	4.4
Subtotal	86			21.6	22.2	3.0
Total	197			22.3	22.8	2.2
Western Management Unit						
Hunting States						
Ariz.	39	21.5	20.3	29.1	27.6	-5.2
Calif.	53	12.6	16.3	11.1	14.3	29.0[d]
Idaho	12	10.6	11.2	25.8	27.2	5.6
Nev.	18	1.1	2.6	5.4	12.3	128.4
Oreg.	14	6.8	8.5	11.3	14.1	24.7
Utah	15	12.2	18.7	7.9	12.0	52.5
Wash.	14	2.6	3.6	12.9	17.9	39.1
Total	165			14.6	17.7	21.2[e]
United States Summary						
Hunting	497			18.6	19.8	6.4
Nonhunting	166			18.6	18.5	-0.6
Total	663			18.6	19.4	4.5

[a] Indices obtained from comparable, randomized route data adjusted for variation in the land area of each physiographic region area presented within year. State data adjusted to a base-year are shown here and in Table 3. Unit and subunit means are derived from State data adjusted to a base-year and weighted by total State land area values.

[b] Significance levels for State and unit changes are determined from analyses of data presented within year.

[c] $P < 0.01$.

[d] $P < 0.10$.

[e] $P < 0.05$.

Table 2. *Factors associated with the mourning dove call-count survey 1973-74.*

States	Date of survey[a]				Temperature at start[b]				High disturbance (%)[a, b]			
	Routes	1973	1974	Change	Routes	1973	1974	Change	Routes	1973	1974	Change
					Eastern Management Unit							
					Hunting States							
Ala.	26	May 24	May 24	0	26	62.9	65.0	2.0	24	16.9	11.3	-5.5
Del.	1	May 30	May 24	-6	1	55.0	64.0	9.0	1	10.0	15.0	5.0
Fla.	16	May 26	May 23	-3c	16	71.3	67.5	-3.9d	16	7.5	10.5	3.0
Ga.	16	May 29	May 27	-2	16	62.3	63.9	1.7	16	10.6	10.3	-0.3
Ill.	14	May 25	May 23	-2	14	54.5	64.4	9.9c	12	14.4	8.5	-5.9
Ky.	14	May 28	May 25	-3	14	57.0	59.0	2.1	13	6.7	9.0	2.2
La.	15	May 29	May 24	-5c	15	65.7	67.4	1.6	15	10.5	23.4	13.0
Md.	7	May 29	May 26	-3	7	63.2	54.7	-8.5	6	8.7	6.4	-2.2
Miss.	19	May 25	May 24	-1	19	63.1	67.3	4.2d	15	14.6	16.9	2.4
N.C.	17	May 25	May 28	3	17	57.2	60.4	3.1	12	8.0	8.8	0.8
Pa.	14	June 2	May 26	-7	14	55.0	52.2	-2.8	13	12.8	14.5	1.7
R.I.	2	May 23	May 22	-1	2	46.0	47.5	1.5	2	22.5	10.0	-12.5
S.C.	17	May 26	May 24	-2	17	59.1	64.6	5.5c	14	9.7	7.6	-2.0
Tenn.	19	May 26	May 24	-2c	18	55.4	64.9	9.5c	14	19.0	16.5	-2.5
Va.	8	May 31	May 25	-6d	8	57.4	54.1	-3.3	8	15.4	10.4	-5.0
W. Va.	7	May 29	May 29	0	7	54.6	56.5	1.9	6	15.5	13.6	-2.0
Subtotal	212	May 27	May 25	-2c	211	60.4	62.7	2.3c	187	12.4	12.5	0.2
					Nonhunting States							
Conn.	1	May 24	May 22	-2	1	50.0	55.0	5.0	1	15.0	5.0	-10.0
Ind.	12	May 27	May 27	0	12	54.1	59.7	5.6c	12	9.5	8.6	-0.9
Mass.	2	May 28	May 26	-2	2	54.0	46.0	-8.0c	1	5.0	15.0	10.0
Maine	0	May 15	May 15	0	0	0.0	0.0	0.0	0	0.0	0.0	0.0
Mich.	12	May 26	May 26	0	12	48.2	51.6	3.4	11	11.2	16.1	4.9
N.H.	2	May 28	May 30	2	2	50.0	47.5	-2.5	2	15.0	12.5	-2.5
N.J.	2	May 28	May 23	-5	2	58.5	54.0	-4.5	2	13.7	11.2	-2.4
N.Y.	5	May 30	May 27	-3	5	55.9	52.7	-3.2	5	5.5	4.8	-0.7
Ohio	10	May 28	May 22	-6	10	54.1	55.0	1.0	10	8.2	5.5	-2.7
Vt.	0	May 15	May 15	0	0	0.0	0.0	0.0	0	0.0	0.0	0.0
Wisc.	18	June 4	June 1	-3e	17	53.7	53.8	0.1	14	11.3	4.9	-6.4
Subtotal	64	May 29	May 27	-2	63	52.8	54.0	1.2	58	9.8	8.8	-1.1
Total	276	May 28	May 25	-3c	274	58.1	60.1	2.0c	245	11.6	11.4	-0.2

Continued

Table 2. *Factors associated with the mourning dove call-count survey 1973-74—Continued.*

States	Date of survey[a]				Temperature at start[b]				High disturbance (%) [a, b]			
	Routes	1973	1974	Change	Routes	1973	1974	Change	Routes	1973	1974	Change
Central Management Unit												
Hunting States												
Ark.	12	May 25	May 26	1	12	62.5	64.5	2.0	10	7.7	8.4	0.7
Colo.	13	May 28	May 26	-2	13	40.6	40.8	0.1	13	2.3	3.9	1.6
Kans.	16	May 30	May 27	-3	16	54.6	59.8	5.1c	14	8.8	9.1	0.3
Mo.	15	May 28	May 25	-3	15	58.5	67.3	8.8c	15	10.7	4.7	-6.0
N. Mex.	15	May 25	May 25	0	15	49.4	48.6	-0.8	13	5.7	9.9	4.2
Okla.	5	May 26	May 23	-3	5	58.1	64.2	6.1	4	2.8	2.4	-0.4
Tex.	22	May 22	May 22	0	22	68.1	63.6	-4.5e	8	19.0	11.6	-7.5
Wyo.	6	May 30	May 27	-3	6	40.5	41.9	1.3	5	15.2	1.2	-14.0
Subtotal	104	May 26	May 25	-1	104	56.0	56.5	0.5	82	10.2	7.2	-3.1
Nonhunting States												
Iowa	13	May 28	May 27	-1	13	51.0	51.8	0.8	12	9.9	5.9	-4.1
Minn.	5	May 26	May 28	2	5	52.2	55.4	3.2	4	16.1	9.2	-6.9
Mont.	7	May 30	May 28	-2	7	44.6	41.1	-3.5	6	9.9	3.6	-6.3
N. Dak.	18	May 25	May 28	3	18	48.0	43.3	-4.7	18	4.1	6.3	2.2
Nebr.	20	May 29	May 26	-3	20	49.1	54.6	5.4d	19	4.9	5.9	1.0
S. Dak.	16	May 27	May 27	0	16	48.1	43.2	-4.9c	15	6.2	5.5	-0.7
Subtotal	79	May 28	May 28	0	79	48.3	47.4	-0.9	74	8.8	5.8	-3.0
Total	183	May 27	May 26	-1	183	53.1	53.0	-0.0	156	9.6	6.6	-3.0
Western Management Unit												
Hunting States												
Ariz.	38	May 26	May 26	0	35	56.6	52.3	-4.3d	33	3.6	2.8	-0.8
Calif.	39	May 30	May 28	-2	39	58.6	55.7	-3.0d	37	11.9	12.6	0.7
Idaho	11	May 27	May 27	0	11	45.2	42.2	-3.0	11	16.9	17.0	0.1
Nev.	14	May 26	May 24	-2e	12	44.9	43.5	-1.4	9	1.8	1.2	-0.6
Oreg.	10	May 23	May 25	2	10	42.0	44.5	2.5	10	5.7	13.6	8.0
Utah	13	May 30	May 29	-1	13	45.6	48.5	2.9	11	0.6	3.4	2.9
Wash.	8	May 21	May 26	5	8	47.5	41.1	-6.4	8	10.0	17.2	7.2
Total	133	May 27	May 27	0	128	50.0	48.2	-1.8e	119	7.3	9.1	1.8

Continued

Table 2. *Factors associated with the mourning dove call-count survey 1973-74—Continued.*

States	Date of survey[a]				Temperature at start[b]				High disturbance (%)[a, b]			
	Routes	1973	1974	Change	Routes	1973	1974	Change	Routes	1973	1974	Change
						United States Summary						
Hunting	449	May 27	May 25	-2[d]	443	55.3	55.5	0.2	388	9.8	9.4	-0.5
Nonhunting	143	May 28	May 27	-1	142	49.7	49.5	-0.2	132	9.1	6.8	-2.4
Total	592	May 27	May 26	-1[d]	585	53.8	53.9	0.1	520	9.6	8.6	-1.0

a Data from comparable randomized routes adjusted for variation in land area of each physiographic region. Calculations performed using 3 significant positions. Change equals the arithmetic difference.

b Percent of stops (listening stations) with the level of disturbance great enough to seriously limit an observer's ability to hear calling doves. 20-stop survey route.

c Level of change significant at $P < 0.01$.

d Level of change significant at $P < 0.05$.

e Level of change significant at $P < 0.10$.

Table 3. *Trends in mourning dove breeding density indices by State, 1964-74*

State	Land area weight	Adjusted average doves heard calling per route[a,b]											Linear regression, 1964-74		Stat. Significance[c]
													Percent change		
		1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Total	Annual	
Eastern Management Unit															
Hunting States															
Ala.	33.32	21.1	20.5	20.5	19.8	16.9	20.6	18.1	16.5	19.8	17.5	18.8	-13.7	-1.5	P .10
Del.	1.29	4.4	5.1	3.8	7.5	5.3	5.3	11.4	3.8	4.6	10.7	10.7	122.0	8.3	P .10
Fla.	35.82	11.2	10.5	9.4	9.1	7.3	8.0	8.8	5.9	7.0	6.8	7.1	-41.3	-5.2	P .01
Ga.	37.82	22.5	18.5	13.1	15.4	14.2	15.5	18.9	12.6	10.6	11.5	12.9	-40.6	-5.1	P .05
Ill.	35.09	24.3	23.5	27.0	27.9	27.4	22.9	30.8	24.8	27.7	27.5	24.3	5.5	0.5	N.S.
Ky.	26.08	30.4	32.5	35.3	29.9	27.4	27.4	28.0	27.7	28.0	27.0	25.7	-20.1	-2.2	P .01
La.	31.14	13.6	11.6	7.7	8.9	7.6	7.4	7.1	7.2	8.4	6.2	6.6	-48.1	-6.3	P .01
Md.	6.55	16.1	16.0	15.2	20.1	17.7	16.9	20.2	19.1	26.6	23.8	25.1	68.7	5.4	P .01
Miss.	30.63	35.1	36.8	33.6	27.7	26.4	28.5	30.5	34.2	35.0	32.5	32.6	-2.4	-0.2	N.S.
N.C.	22.51	21.9	24.8	26.4	21.4	22.7	17.6	18.8	12.5	11.7	14.8	10.1	-57.8	-8.2	P .01
Pa.	29.01	7.2	7.4	8.7	11.9	7.9	8.6	6.2	5.9	7.0	5.6	5.5	-34.8	-4.2	P .10
R.I.	0.67	5.6	3.8	4.4	5.6	2.8	2.6	0.9	2.6	1.9	2.0	2.4	-71.6	-11.7	P .01
S.C.	19.99	24.1	35.3	34.4	34.2	33.5	36.1	29.8	31.2	25.5	33.3	31.3	-2.4	-0.2	N.S.
Tenn.	27.07	28.1	30.4	30.4	22.3	24.2	23.2	36.0	32.3	38.6	28.6	27.7	15.8	1.5	N.S.
Va.	26.05	29.0	24.0	29.1	23.6	31.8	24.4	21.7	18.8	11.2	13.4	19.4	-49.9	-6.7	P .01
W. Va.	15.41	23.4	22.6	9.8	5.0	5.0	5.7	6.6	5.7	8.9	5.7	4.9	-87.2	-18.0	P .05
Subtotal	378.45	21.9	22.0	21.2	19.6	19.0	18.6	20.0	17.9	18.4	17.6	17.5	-21.1	-2.3	P .01
Nonhunting States															
Conn.	3.23	2.4	1.9	2.9	4.5	4.9	0.7	5.5	6.0	5.5	5.5	27.5	-100.0	26.2	P .05
Ind.	23.36	27.7	20.2	37.2	38.6	41.5	37.9	38.7	49.0	41.6	36.8	33.3	37.0	3.2	N.S.
Maine	19.85	0.0	0.5	0.0	0.0	1.0	1.4	0.0	0.0	0.0	0.0	0.0	-68.2	-10.8	N.S.
Mass.	5.31	6.7	7.7	11.0	14.5	4.9	1.5	5.3	4.7	6.1	6.1	4.8	-50.7	-6.8	N.S.
Mich.	37.18	13.2	8.0	12.3	11.9	9.1	11.7	10.4	14.6	15.4	11.7	10.8	15.7	1.5	N.S.
N.H.	5.80	1.1	1.9	1.4	0.9	0.8	0.7	0.8	2.9	2.1	4.4	2.1	246.8	13.4	P .10
N.J.	4.91	30.4	25.7	24.2	20.1	19.5	17.0	21.3	23.6	25.5	23.1	17.3	-22.6	-2.5	N.S.
N.Y.	30.49	7.0	7.1	7.9	7.8	6.9	5.9	5.4	4.9	6.4	5.7	4.9	-33.3	-4.0	P .01
Ohio	26.42	16.8	19.1	26.3	25.5	27.0	30.6	34.0	26.2	27.5	22.0	20.4	16.3	1.5	N.S.
Vt.	5.95	0.1	0.1	0.2	0.2	0.1	0.1	0.3	0.0	0.0	0.0	0.0	-87.2	-17.9	N.S.
Wisc.	36.07	15.2	16.1	11.1	13.5	11.5	10.0	8.6	11.7	11.2	12.5	9.9	-30.4	-3.6	P .05
Subtotal	198.57	12.8	11.4	14.4	14.8	14.1	14.1	14.1	15.7	15.3	13.6	12.3	7.3	0.7	N.S.
Total	577.02	18.8	18.4	18.9	17.9	17.3	17.0	18.0	17.1	17.4	16.2	15.7	-14.3	-1.5	P .01

Continued

Table 3. *Trends in mourning dove breeding density indices by State, 1964-1974—Continued.*

State	Land area weight	Adjusted average doves heard calling per route [a, b]											Linear regression, 1964-74 Percent change		Stat. significance [c]
		1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Total	Annual	
		Central Management Unit													
		Hunting States													
Ark.	34.37	16.8	14.8	16.5	20.7	20.0	22.3	22.9	24.3	24.1	25.5	26.0	70.3	5.5	P .01
Colo.	67.18	13.1	11.5	14.8	16.1	13.7	19.6	20.5	18.8	20.5	19.7	25.6	94.7	6.9	P .01
Kans.	52.43	53.1	48.2	51.8	60.3	59.0	65.4	60.5	58.7	61.6	57.2	45.9	4.6	0.4	N.S.
Mo.	45.10	40.2	36.0	39.3	36.6	39.9	25.4	31.4	29.5	39.9	29.9	26.0	-26.9	-3.1	P .05
N. Mex.	77.98	20.6	19.3	28.4	8.5	12.7	8.8	8.3	6.8	8.6	4.9	5.0	-86.9	-17.8	P .01
Okla.	44.40	37.7	34.6	29.3	37.9	39.8	30.2	26.4	14.6	43.6	42.2	46.1	15.6	1.5	N.S.
Tex.	170.03	17.4	16.4	17.8	16.8	17.3	16.5	18.8	18.7	24.0	18.8	20.2	26.5	2.4	P .05
Wyo.	62.33	9.8	12.1	15.9	13.0	9.3	20.7	19.5	9.5	9.5	8.9	11.9	-12.3	-1.3	N.S.
Subtotal	553.82	23.3	21.7	24.5	22.8	23.1	23.1	23.4	20.7	26.2	22.7	23.1	1.7	0.2	N.S.
		Nonhunting States													
Iowa	36.15	34.9	29.0	33.2	34.1	30.6	25.8	17.1	20.8	19.6	18.2	15.8	-56.5	-8.0	P .01
Minn.	54.09	20.5	18.6	18.7	16.7	18.2	10.7	8.7	13.0	13.1	11.7	18.0	-36.0	-4.4	P .10
Mont.	94.47	15.4	15.7	17.1	18.7	5.7	6.6	5.0	6.5	4.7	3.8	2.9	-91.6	-20.6	P .01
Nebr.	49.69	66.1	55.6	48.5	40.0	47.9	47.3	46.7	45.3	47.8	48.6	47.7	-18.9	-2.1	N.S.
N. Dak.	45.54	20.2	23.4	20.7	20.7	24.2	20.3	16.8	17.1	17.9	23.2	23.1	-4.0	-0.4	N.S.
S. Dak.	49.20	39.0	35.1	45.3	28.2	31.2	28.7	30.5	36.5	37.7	40.5	42.3	8.2	0.8	N.S.
Subtotal	329.14	30.2	27.6	28.6	25.0	23.2	20.7	18.7	20.9	21.0	21.6	22.2	-32.2	-3.8	P .01
Total	882.96	25.9	23.9	26.0	23.6	23.1	22.2	21.7	20.8	24.3	22.3	22.8	-12.4	-1.3	P .05

Table 3. *Trends in mourning dove breeding density indices by State, 1964-74—Continued.*

State	Land area weight	Adjusted average doves heard calling per route[a,b]											Linear regression, 1964-74		
													Percent change		Stat. signifi-cance[c]
		1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Total	Annual	
Western Management Unit															
Hunting States															
Ariz.	72.65	27.6	26.6	30.4	27.6	24.2	27.0	20.0	13.1	17.5	29.1	27.6	-20.5	-2.3	N.S.
Calif.	101.71	32.0	21.6	17.3	14.2	11.9	11.5	10.9	11.1	11.8	11.1	14.3	-63.0	-9.4	P .05
Idaho	54.37	20.6	19.4	18.6	17.8	18.0	17.0	21.8	22.7	29.4	25.8	27.2	56.2	4.6	P .01
Nev.	71.27	2.9	2.7	4.0	4.4	8.2	6.3	5.7	3.3	6.6	5.4	12.3	194.3	11.5	P .05
Oreg.	62.27	18.1	14.1	14.0	12.9	13.2	15.0	10.3	11.9	11.2	11.3	14.1	-26.4	-3.0	P .05
Utah	53.34	12.9	13.7	14.8	22.2	12.6	9.4	7.8	13.8	9.2	7.9	12.0	-39.0	-4.8	N.S.
Wash.	43.87	13.2	13.1	13.3	11.4	10.5	11.1	12.3	12.4	12.0	12.9	17.9	17.5	1.6	N.S.
Total	459.48	19.5	16.4	16.3	15.7	14.1	14.0	12.5	12.1	13.6	14.6	17.7	-18.1	-2.0	N.S.
United States Summary															
Hunt	1,391.75	21.7	20.0	20.9	19.6	19.0	18.9	18.9	17.1	19.9	18.6	19.8	-10.3	-1.1	P .10
Nonhunt	527.71	23.7	21.5	23.3	21.2	19.8	18.2	17.0	19.0	18.9	18.6	18.5	-23.3	-2.6	P .01
Total	1,919.46	22.2	20.4	21.5	20.0	19.2	18.7	18.4	17.6	19.6	18.6	19.4	-14.0	-1.5	P .05

a The average number of doves heard per route adjusted annually to a base year according to the percent change from preceding year on comparable routes. Except as noted, 1967 selected as base year, representing the mean number of doves heard on comparable routes run in both 1966 and 1967. Maine, N.H., R.I., and Vt. indices assigned 1971 base year, representing the mean number of doves heard on comparable routes run in both 1970 and 1971. See text for additional information.

b Unit and subunit indices derived from weighted State values (this table) carried to 3 positions.

c Statistical significance of trends: N.S. = not significant ($P > 0.10$); N.E. = no estimate available.

Table 4. *Trends in mourning dove breeding density indices by physiographic region, 1965-74.*

Eastern Management Unit

| Region | Land area weight | Adjusted average doves heard calling per route [a,b] | | | | | | | | | | | Linear regression, 1965-74 | | |
| | | | | | | | | | | | | | Percent change [c] | | Stat. signifi- cance [d] |
		1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Total	Annual	
10	32.10	N.E.	8.8	4.3	3.8	3.6	2.8	2.0	3.4	3.4	3.2	2.7	-64.6	-10.9	P .05
31	15.34	N.E.	29.5	30.3	28.5	28.2	21.5	24.9	27.5	31.1	26.5	24.9	-10.3	-1.2	N.S.
32	16.40	N.E.	53.0	39.3	45.8	47.9	44.5	39.6	40.1	33.8	37.7	42.2	-22.4	-2.8	P .05
33	24.79	N.E.	13.4	10.2	10.1	9.1	9.1	11.5	7.2	10.2	9.7	8.6	-24.2	-3.0	N.S.
34	63.72	N.E.	26.8	22.9	20.6	17.7	20.4	21.2	19.9	23.5	21.4	19.5	-12.9	-1.5	N.S.
35	20.50	N.E.	27.1	28.4	29.1	27.4	28.7	34.8	36.7	32.8	34.3	38.9	41.4	3.9	P .01
36	15.69	N.E.	18.1	19.6	18.0	16.6	16.3	16.3	20.2	20.9	21.3	27.9	42.4	4.0	P .05
37	33.14	N.E.	12.1	12.7	11.8	10.5	16.0	17.6	8.5	5.3	7.8	6.7	-46.2	-6.7	P .10
41	39.35	N.E.	19.3	21.1	17.6	22.8	17.9	16.7	13.7	9.8	12.2	14.5	-44.3	-6.3	P .01
42	3.51	N.E.	14.6	24.1	24.6	35.7	31.4	27.3	31.5	33.1	37.3	36.0	80.4	6.8	P .01
51[e]	1.93	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.
52	6.09	N.E.	10.0	13.2	11.2	13.2	7.7	11.8	10.3	12.2	12.2	8.0	-11.6	-1.4	N.S.
61	17.62	N.E.	25.6	25.6	20.5	16.4	19.1	33.0	24.8	32.2	25.9	25.8	25.0	2.5	N.S.
62	18.99	N.E.	17.0	15.4	12.2	15.6	16.8	14.4	11.0	12.2	10.2	12.0	-32.5	-4.3	P .05
70[e]	2.40	N.E.	N.E.	N.E.	0.0	N.E.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N.S.
81	27.02	N.E.	7.4	9.2	14.5	12.2	9.3	7.9	7.8	10.0	8.5	7.8	-19.8	-2.4	N.S.
82	1.32	N.E.	N.E.	3.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	-100.0	-69.6	P .10
85	32.72	N.E.	5.4	6.5	4.9	3.3	4.1	3.7	5.1	4.8	4.3	4.0	-24.7	-3.1	N.S.
86	7.27	N.E.	11.2	10.8	7.9	9.4	9.7	9.5	7.1	8.7	7.4	10.6	-17.5	-2.1	N.S.
91	9.28	N.E.	N.E.	28.7	35.3	17.8	4.7	10.2	11.3	11.6	11.7	14.5	-70.8	-14.3	P .10
92[e]	10.00	N.E.	N.E.	N.E.	N.E.	N.E.	0.4	0.7	2.6	1.9	3.9	1.9	317.6	33.1	N.S.
93[e]	20.12	N.E.	N.E.	N.E.	N.E.	N.E.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N.S.
95[e]	1.64	N.E.	N.E.	N.E.	1.5	1.5	1.5	3.9	2.0	4.0	4.0	0.0	N.E.	N.E.	N.E.
100	6.71	N.E.	N.E.	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-100.0	-62.7	N.S.
111	25.51	N.E.	43.3	45.1	39.3	38.5	35.6	35.1	37.8	38.0	31.3	33.6	-24.5	-3.1	P .01
112	6.70	N.E.	18.2	31.3	17.0	14.2	20.8	17.7	18.1	17.4	16.4	14.4	-31.6	-4.1	N.S.
113	2.07	N.E.	27.0	27.0	10.9	17.6	15.2	17.5	12.4	21.2	18.8	27.6	-3.8	-0.4	N.S.
121	46.46	N.E.	10.0	15.6	15.7	12.6	15.3	13.1	15.9	15.5	12.9	11.9	1.8	0.2	N.S.
123	12.09	N.E.	22.7	18.6	23.0	19.8	15.3	16.0	19.8	20.5	18.1	14.8	-22.1	-2.7	P .10
124	56.27	N.E.	28.2	32.9	35.3	36.3	34.1	40.1	34.2	35.1	33.0	30.0	2.5	0.3	N.S.
141	0.27	N.E.	30.3	26.2	32.6	33.5	27.8	30.7	24.7	37.2	24.4	22.6	-14.4	-1.7	N.S.
Total/ Average	577.02	N.E.	18.4	18.9	17.9	17.3	17.0	18.0	17.1	17.4	16.2	15.7	-13.3	-1.6	P .01

Continued

Table 4. *Trends in mourning dove breeding density indices by physiographic region, 1965-74—Continued.*

Central Management Unit

| Region | Land area weight | Adjusted average doves heard calling per route[a,b] | | | | | | | | | | | Linear regression, 1965-74 | | |
| | | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | Percent change[c] | | Stat. significance[c] |
													Total	Annual	
10	30.37	N.E.	8.8	4.3	3.8	3.6	2.8	2.0	3.4	3.4	3.2	2.7	-64.6	-10.9	P .05
35	16.60	N.E.	27.1	28.4	29.1	27.4	28.7	34.8	36.7	32.8	34.3	38.9	41.4	3.9	P .01
36	77.45	N.E.	18.1	19.6	18.0	16.6	16.3	16.3	20.2	20.9	21.3	27.9	42.4	4.0	P .05
122	64.68	N.E.	34.1	37.0	33.6	35.5	27.4	25.1	30.5	31.2	37.1	36.0	-1.9	-0.2	N.S.
123	2.54	N.E.	22.7	18.6	23.0	19.8	15.3	16.0	19.8	20.5	18.1	14.8	-22.1	-2.7	P .10
124	0.82	N.E.	28.2	32.9	35.3	36.3	34.1	40.1	34.2	35.1	33.0	30.0	2.5	0.3	N.S.
125	58.68	N.E.	38.9	46.5	43.1	50.8	37.7	33.2	38.3	45.0	35.2	29.9	-23.3	-2.9	N.S.
126	71.40	N.E.	35.4	36.0	43.3	43.6	37.9	43.1	38.6	52.1	45.8	43.6	25.9	2.6	P .05
130	14.35	N.E.	50.9	67.8	37.4	49.3	45.3	41.5	37.5	39.5	22.8	21.8	-57.0	-9.0	P .01
131	46.47	N.E.	18.5	15.7	12.9	20.7	24.1	19.6	22.3	24.1	21.3	18.2	29.4	2.9	N.S.
132	81.54	N.E.	41.1	45.0	37.1	23.0	21.0	18.4	23.2	20.5	20.8	22.9	-58.9	-9.4	P .01
133e	2.89	N.E.	5.0	5.0	0.0	N.E.	41.0	71.1	23.2	31.4	30.0	N.E.	N.E.	N.E.	N.E.
134	97.09	N.E.	27.5	22.0	20.0	24.2	23.8	22.9	22.6	23.2	22.9	23.3	-5.0	-0.6	N.S.
135	25.78	N.E.	50.8	53.1	61.7	59.3	64.8	66.7	61.6	68.1	66.6	59.8	21.3	2.2	P .05
136	16.40	N.E.	16.6	15.4	14.7	12.6	19.4	20.7	10.9	20.5	19.1	21.6	36.0	3.5	N.S.
137	10.54	N.E.	2.3	11.0	4.2	6.1	7.4	11.1	9.4	5.2	49.4	151.1	—	346.2	P .05
138	19.75	N.E.	114.3	165.0	28.7	41.6	14.8	17.3	4.9	9.0	4.2	4.3	-100.0	-78.5	P .01
139	22.05	N.E.	1.8	1.6	24.5	8.7	19.8	17.0	9.6	12.1	8.7	6.7	16.8	1.7	N.S.
141	27.75	N.E.	30.3	26.2	32.6	33.5	27.8	30.7	24.7	37.2	24.4	22.6	-14.4	-1.7	N.S.
142	3.11	N.E.	19.4	7.4	5.0	2.3	3.5	2.3	1.9	6.1	2.3	2.3	-98.4	-36.9	P .05
151	4.70	N.E.	6.7	20.2	13.0	21.0	21.5	15.9	20.6	26.2	14.8	25.2	76.8	6.5	P .10
152	6.98	N.E.	3.0	3.0	3.3	3.9	4.9	3.3	5.0	4.9	5.2	3.2	44.6	4.2	N.S.
160	28.53	N.E.	2.9	5.1	2.6	4.4	7.5	5.2	4.3	5.8	3.1	5.0	24.4	2.5	N.S.
170	24.23	N.E.	10.9	14.5	17.2	8.1	13.4	17.9	12.2	13.0	11.3	17.8	15.1	1.6	N.S.
180	23.58	N.E.	3.7	5.6	6.4	7.7	7.7	7.4	5.8	5.0	3.0	5.4	-13.8	-1.6	N.S.
190	33.18	N.E.	8.2	9.9	7.1	6.1	7.2	8.2	10.3	8.8	8.2	8.5	9.2	1.0	N.S.
212	4.68	N.E.	8.2	22.7	55.7	9.9	14.4	5.4	17.5	7.5	10.1	9.4	-68.2	-11.9	N.S.
213	6.02	N.E.	0.9	1.4	4.0	4.2	6.2	8.1	9.5	6.7	7.9	8.7	455.9	21.0	P .01
214	11.49	N.E.	8.3	16.9	7.1	9.0	10.3	8.8	4.8	13.6	21.2	13.7	60.6	5.4	N.S.
216	7.07	N.E.	84.7	75.6	28.7	46.5	20.6	17.9	48.7	28.1	15.0	13.3	-86.8	-20.2	P .01
224	31.91	N.E.	20.5	18.7	16.8	15.2	15.5	13.2	14.4	18.2	24.9	18.0	7.4	0.8	N.S.
225	10.33	N.E.	N.E.	5.6	2.2	3.9	6.1	12.3	0.8	5.1	5.1	4.4	2.4	0.3	N.S.
Total/ Average	882.96	N.E.	23.9	26.1	23.6	23.1	22.2	21.7	20.8	24.3	22.3	22.8	-9.1	-1.1	N.S.

Continued

Table 4. *Trends in mourning dove breeding density indices by physiographic region, 1965-74—Continued.*

Western Management Unit

Region	Land area weight	Adjusted average doves heard calling per route[a,b]											Linear regression, 1965-74 Percent change[c]		Stat. significance[d]
		1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Total	Annual	
180	8.00	N.E.	3.7	5.6	6.4	7.7	7.7	7.4	5.8	5.0	3.0	5.4	-13.8	-1.6	N.S.
190	32.19	N.E.	8.2	9.9	7.1	6.1	7.2	8.2	10.3	8.8	8.2	8.5	9.2	1.0	N.S.
201	27.15	N.E.	8.9	9.9	9.0	11.2	9.1	8.3	9.9	9.2	11.6	13.9	33.8	3.3	P .10
202	5.05	N.E.	6.5	7.2	5.8	8.4	5.9	7.5	7.5	6.3	5.7	6.3	-8.7	-1.0	N.S.
203	19.43	N.E.	6.8	16.0	21.1	16.4	17.3	18.6	22.7	22.3	21.2	29.3	123.7	9.4	P .01
204	11.00	N.E.	12.2	23.3	22.2	20.9	14.4	22.6	18.1	31.9	34.8	23.2	77.0	6.5	P .10
205	6.17	N.E.	92.8	172.3	39.8	30.9	44.3	28.7	15.7	13.8	6.9	4.8	-100.0	-78.5	P .05
211	8.20	N.E.	7.7	10.2	9.5	5.0	0.0	6.7	14.4	27.8	0.0	0.0	-9.2	-1.1	N.S.
212	5.96	N.E.	8.2	22.7	55.7	9.9	14.4	5.4	17.5	7.5	10.1	9.4	-68.2	-11.9	N.S.
213	12.24	N.E.	0.9	1.4	4.0	4.2	6.2	8.1	9.5	6.7	7.9	8.7	455.9	21.0	P .01
214	12.54	N.E.	8.3	16.9	7.1	9.0	10.3	8.8	4.8	13.6	21.2	13.7	60.6	5.4	N.S.
215	13.78	N.E.	6.9	11.8	13.7	10.0	29.2	14.4	12.6	17.5	6.4	9.9	0.3	0.0	N.S.
216	1.46	N.E.	84.7	75.6	28.7	46.5	20.6	17.9	48.7	28.1	15.0	13.3	-86.8	-20.2	P .01
221	115.89	N.E.	11.1	11.5	14.1	13.8	10.2	9.0	9.1	9.1	7.0	12.2	-27.2	-3.5	N.S.
222	35.86	N.E.	50.0	49.5	36.8	31.1	27.6	18.7	14.4	17.5	27.5	32.1	-59.3	-9.5	P .05
223	4.20	N.E.	25.4	21.9	22.4	18.5	19.6	26.1	27.9	28.0	26.7	40.3	64.9	5.7	P .05
224	24.20	N.E.	20.5	18.7	16.8	15.2	15.5	13.2	14.4	18.2	24.9	18.0	7.4	0.8	N.S.
231	7.99	N.E.	16.9	12.1	11.9	12.2	15.2	11.2	9.5	10.0	9.9	10.7	-35.0	-4.7	P .05
232	14.07	N.E.	7.9	8.1	5.5	4.9	3.0	2.1	4.4	1.5	2.3	6.9	-59.2	-9.5	N.S.
233e	4.42	N.E.	46.6	20.0	19.0	N.E.	N.E.	N.E.	14.5	18.5	22.8	23.5	62.1	17.5	P .05
234	16.87	N.E.	11.0	12.2	11.9	10.9	9.3	10.7	8.9	9.6	8.6	10.9	-19.9	-2.4	P .10
241	8.84	N.E.	0.5	0.0	2.5	2.5	0.8	0.8	0.0	0.5	0.0	0.0	-88.2	-21.2	N.S.
242	2.95	N.E.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N.S.
243	8.29	N.E.	28.2	10.1	4.0	28.2	2.0	6.0	4.0	16.0	0.0	6.0	-84.3	-18.6	N.S.
244	10.48	N.E.	6.6	5.4	4.9	6.8	7.3	7.1	8.7	5.9	13.8	13.8	167.3	11.5	P .05
245	13.01	N.E.	20.5	15.3	12.6	13.3	13.5	11.1	14.0	14.4	8.9	11.0	-39.6	-5.5	P .05
246	19.64	N.E.	31.2	26.2	22.8	23.5	21.3	21.1	21.2	25.0	18.6	25.3	-21.2	-2.6	N.S.
247	8.10	N.E.	7.4	5.2	4.3	1.8	6.0	6.0	3.2	1.8	9.0	9.6	46.9	4.4	N.S.
250e	1.50	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.
Total/ Average	459.48	N.E.	16.4	16.3	15.7	14.1	14.0	12.5	12.1	13.6	14.6	17.7	-6.5	-0.7	N.S.

Continued

Table 4—Continued

a The average number of doves heard per route adjusted annually to a base year according to the percent change from preceding year on comparable routes. The base year represents the mean numbers of doves heard per route in 1968, 1969, and 1970; the resultant value being assigned to 1969. N.E. = no estimate available.

When a physiographic region is bisected by a management unit boundary, its mean breeding density index is assigned to both units.

b The management unit breeding indices are obtained from Table 3.

c Regression analysis: (1) 0.0 calculated as 0.0001.

(2) Annual percent change greater than 999 equals no estimate (N.E.).

d Statistical significance of trend: N.S. = not significant ($P > 0.10$); N.E. = no estimate available.

e Linear regression analysis from most recent available data; results not comparable to other analyses.

Determination of
Population Changes

Year-to-year changes in breeding population levels were determined from comparable data (Table 1). Routes run under acceptable conditions by the same observer in successive years were deemed comparable, and data from different observers were accepted when changes in number of doves heard did not exceed predetermined, expected values between years (Ruos 1972).

Long-term population trends were determined by applying the percentage change in the BDI between successive years to a Base Year (BY) index. The year 1967 was selected as the BY for all States except Maine, New Hampshire, Rhode Island, and Vermont. The BDI's for this BY represented the mean number of doves heard on comparable routes run in 1966 and 1967 (Tables 1, 3). The four excepted States were assigned a 1971 BY index, representing the mean BDI of comparable routes run in 1970 and 1971 (Table 3).

Long-term trend data have also been determined for each physiographic region. Yearly BDI's for regions were adjusted to a 1969 BY index representing the mean BDI for routes accepted in 1968, 1969, and 1970 (Table 4).

Determination of Changes
in Factors Associated
With the Survey

Annual changes in the mean survey date, temperature at the start of the survey, and percentage of route listening stations with high disturbance are presented in Table 2. Analyses of these factors were similar to methods described for determining year-to-year changes in the BDI (Ruos 1972).

Changes in the
Grouping of Central
Management Unit States

Change in status of Wyoming from a nonhunting to a hunting State, and of South Dakota from a hunting to a nonhunting State, occurred in 1973. As a result, their current status is reflected in the revised groupings of States within the Central and U.S. Units. The long-term trend data presented in "Findings" include these States as if they had been in their current groups for the entire period (1964–74). Subunit indices for these groups of States differ from previous reports. However, management unit and the U.S. indices are not affected by this restructuring.

Statistical Evaluation of Data

The Call-Count Survey was designed to detect major year-to-year changes in the breeding popula-

tion index for each management unit (Foote 1959). In recent years, analysis of data revealed that observed differences of about 8, 9, and 13% between years within the Eastern, Central, and Western Management Units, respectively, would be statistically significant at the 5% level. Although the survey was not designed to detect a change between years in the BDI's of States or physiographic regions, data from these areas were also subjected to statistical analysis.

Long-term BDI's, adjusted to a BY for all physiographic regions, States, and management units, were examined to determine whether significant trends were present. Trends were determined by linear regression analysis.

Determination of
Population Distribution

The geographic distribution of dove densities has been determined from a study of BDI values adjusted to a BY for each physiographic region and State. For graphic presentation, the 1974 data have been assigned to one of five density classes (Figs. 3, 4). Changes in the adjusted BDI's greater than 10% between 1973 and 1974 within physiographic region and State also were determined (Figs. 5, 6).

Findings

The further recovery of the Western Management Unit population index from the 1971 low and the further decline of Eastern Management Unit indices in 1974 highlight this report. From 1973 to 1974, population indices decreased by 3% in the Eastern Management Unit, but increased by 2% in the Central Management Unit and by 21% in the Western Management Unit. All management unit indices for the 11-year period 1964–74 are represented by downward trends. Since 1971, however, the trend in the Western Unit has been upward. The 1974 Eastern and Central Unit indices are below their preceding 10-year means, and the Eastern Unit index is at a 21-year low. The Western Unit index for 1974 is substantially above this long-term mean.

Status of the
United States Dove Population

In 1973, dove hunting was permitted in 31 of the 48 contiguous States, which represent 73% of the land area and 74% of the 1974 breeding population. In 1974, the mean breeding population index was 19.4 doves per route for the United States; for hunting States it was 19.8 doves per route and, for nonhunting States, 18.5 doves (Table 1).
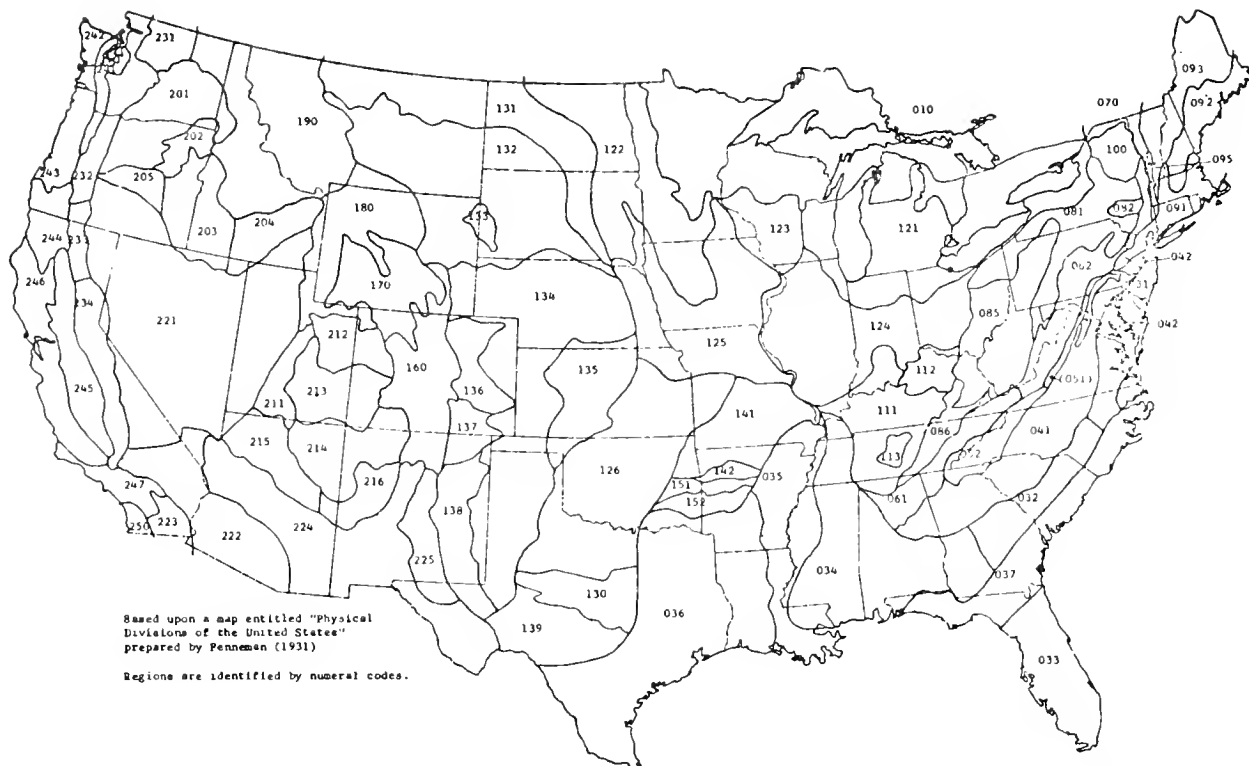
16

Based upon a map entitled "Physical
Divisions of the United States"
prepared by Fenneman (1931)

Regions are identified by numeral codes.

Fig. 2. Physiographic regions used in analysis of mourning dove population data, revised 1970.

Mean doves heard calling per route,
1974, adjusted to a Base Year

☐ 0.0– 9.9	▦ 30.0–39.9
▨ 10.0–19.9	▩ 40.0+
▤ 20.0–29.9	
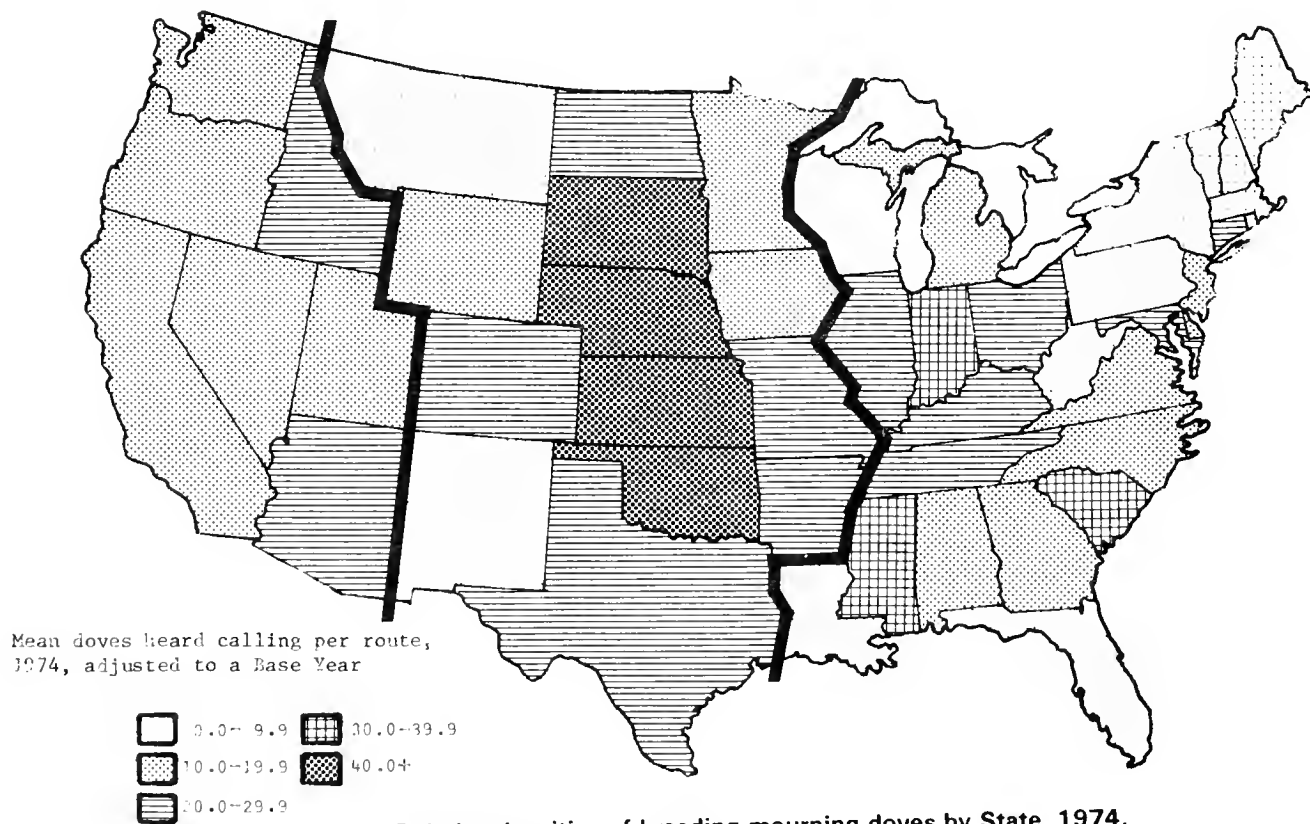
Fig. 3. Relative densities of breeding mourning doves by State, 1974.

Physiographic regions used in analysis of mourning dove population data, revised 1970.
(modified after Fenneman 1931)

Description	Stratum Code
Laurentian Upland Division	
Superior Upland Province	010
Atlantic Plain Division	
Coastal Plain Province	
Embayed section	031
Upper Coastal Plain	032
Floridian section	033
East Gulf Coastal Plain	034
Mississippi Alluvial Plain	035
West Gulf Coastal Plain	036
Lower Coastal Plain	037
Appalachian Highlands Division	
Piedmont Province	
Piedmont Uplands	041
Piedmont Lowlands	042
Blue Ridge Province	
Northern section	051
Southern section	052
Valley and Ridge Province	
Tennessee section	061
Middle and Hudson Valley section	062
St. Lawrence Valley Province	
Champlain and Northern section	070
Appalachian Plateaus Province	
Mohawk and Allegheny section	081
Catskill section	082
Kanawha section	085
Cumberland section	086
New England Province	
Southern New England section	091
Northern New England section	092
Mountain section	093
Taconic section	095
Adirondack Province	100

Description	Stratum Code
Interior Plains Division	
Interior Low Plateaus Province	
Highland Rim section	111
Lexington Plain	112
Nashville Basin	113
Central Lowland Province	
Eastern lake section	121
Western lake section	122
Wisconsin Driftless section	123
Till Plains	124
Dissected Till Plains	125
Osage Plains	126
Great Plains Province	
Central Texas section	130
Missouri Plateau, glaciated	131
Missouri Plateau, unglaciated	132
Black Hills	133
High Plains	134
Plains Border	135
Colorado Piedmont	136
Raton section	137
Pecos Valley	138
Edwards Plateau	139
Interior Highlands Division	
Ozark Plateaus Province	
Springfield-Salem plateaus	141
Boston "Mountains"	142
Ouachita Province	
Arkansas Valley	151
Ouachita Mountains	152
Rocky Mountain Division	
Southern Rocky Mountains Province	160
Wyoming Basin Province	170
Middle Rocky Mountains Province	180
Northern Rocky Mountains Province	190

Description	Stratum Code
Intermontane Plateaus Division	
Columbia Plateaus Province	
Walla Walla Plateau	201
Blue Mountain section	202
Payette section	203
Snake River Plain	204
Harney section	205
Colorado Plateaus Province	
High Plateaus of Utah	211
Uinta Basin	212
Canyon Lands	213
Navajo section	214
Grand Canyon section	215
Datil section	216
Basin and Range Province	
Great Basin	221
Sonoran Desert	222
Salton Trough	223
Mexican Highland	224
Sacramento section	225
Pacific Mountain Division	
Cascade Sierra Mountains Province	
Northern Cascade Mountains	231
Middle Cascade Mountains	232
Southern Cascade Mountains	233
Sierra Nevada	234
Pacific Border Province	
Puget Trough	241
Olympic Mountains	242
Oregon Coast Range	243
Klamath Mountains	244
California Trough	245
California Coast Ranges	246
Los Angeles Ranges	247
Lower California Province	250

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lean doves heard calling per route, 1974,
adjusted to a Base Year

☐ 0.0 - 9.9	▦ 30.0 - 39.9
▨ 10.0 - 19.9	▨ 40.0 -
▤ 20.0 - 29.9	☐ no data
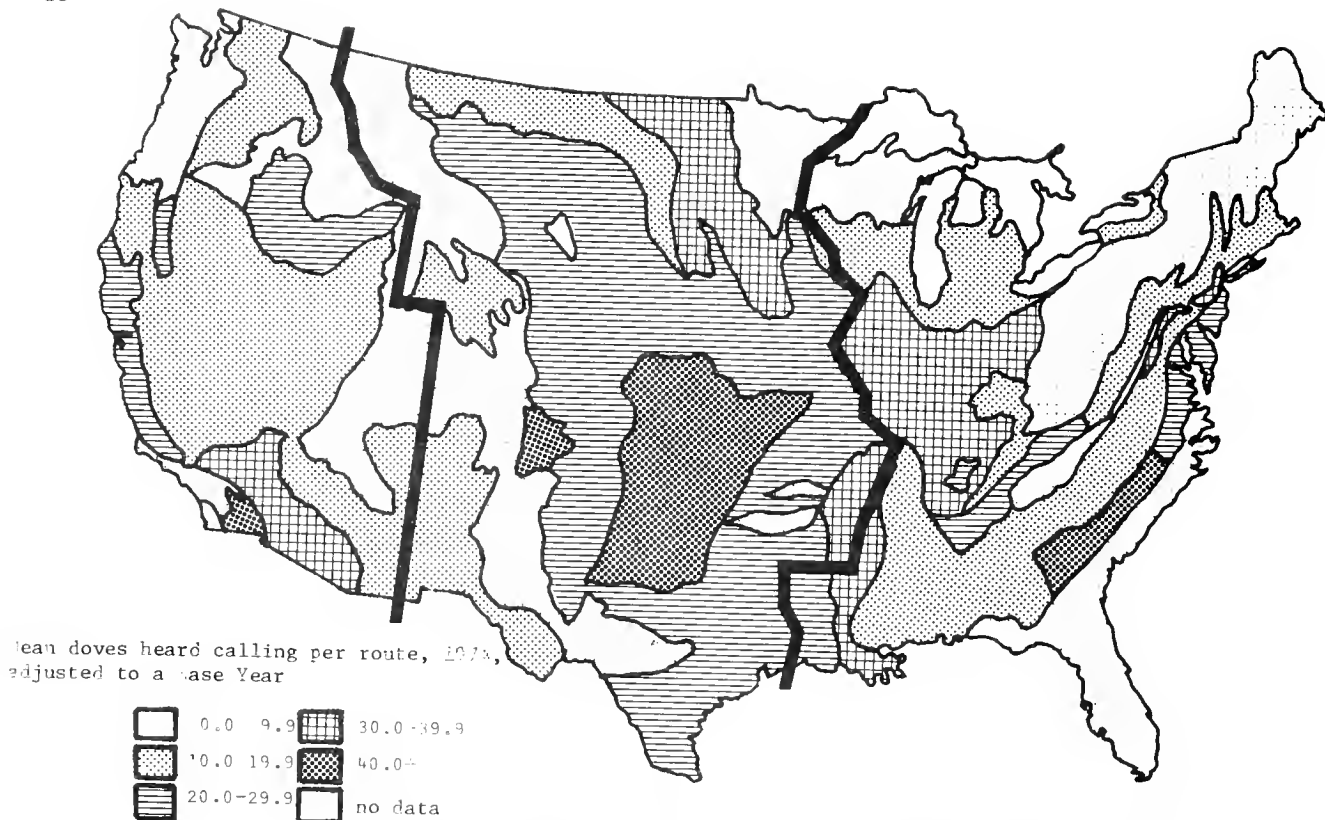
Fig. 4.   Relative densities of breeding mourning doves by physiographic region, 1974.

Change in mean doves heard calling
per route between 1973 and 1974

☐ Decrease   (>10%)
☐ No Change (<10%)
▨ Increase   (>10%)
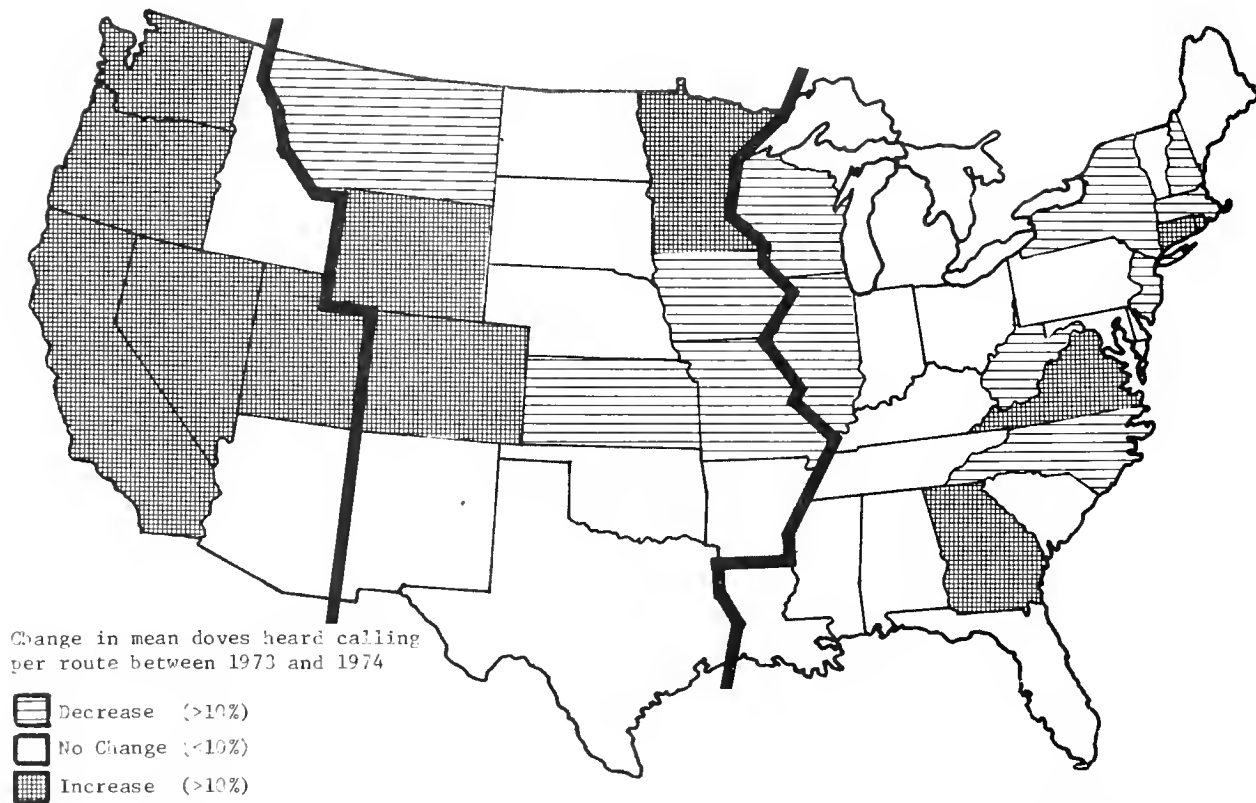
Fig. 5.   Changes in densities of breeding mourning doves by State between 1973 and 1974.

Change in mean doves heard calling
per route between 1973 and 1974

- Decrease (>10%)
- No Change (<10%)
- Increase (>10%)
- Insufficient Data
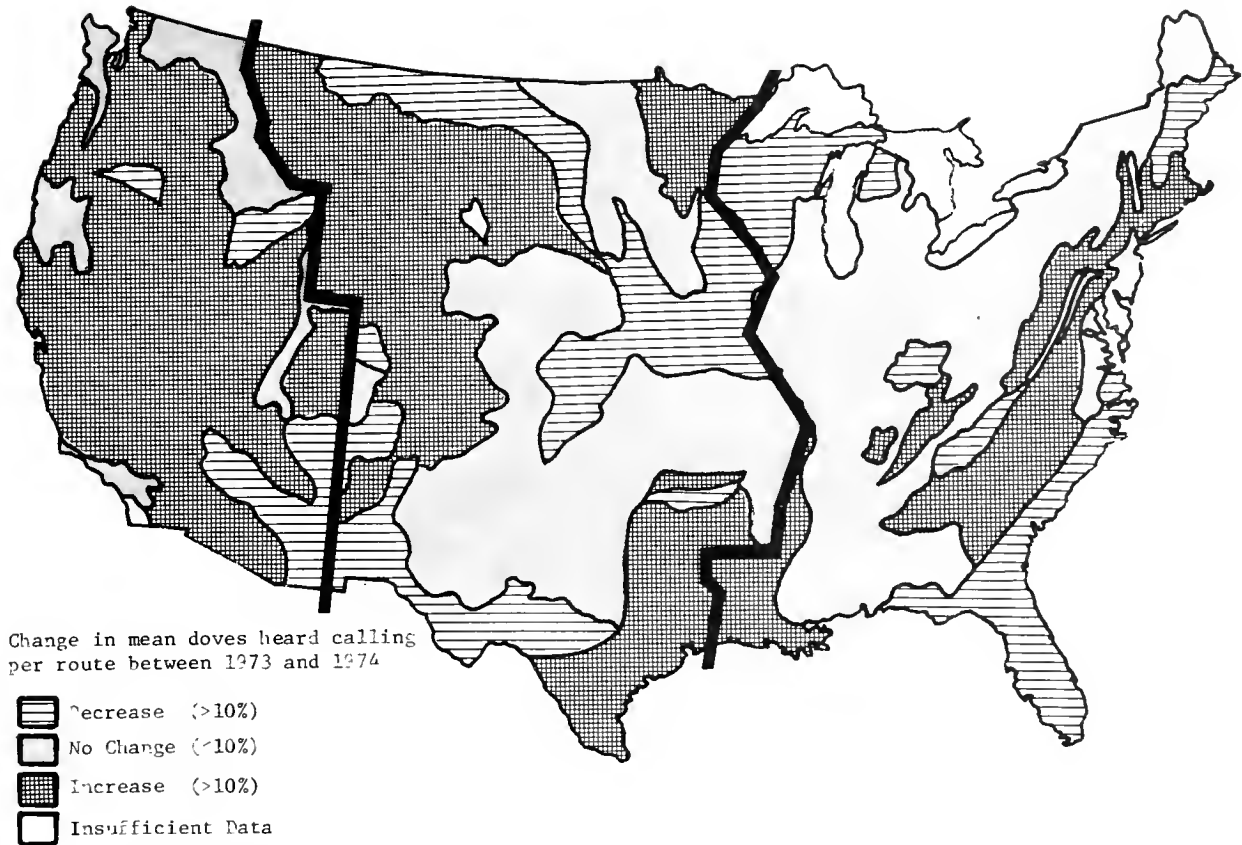
Fig. 6. Changes in densities of breeding mourning doves by physiographic region between 1973 and 1974.

1974 Population Distribution

The area of highest dove density was in South Dakota, Nebraska, Kansas, and Oklahoma (Fig. 3), especially in portions of the southern Great Plains and adjacent Central Lowlands (Regions 135 and 126, respectively, Fig. 2, 4). Low breeding population levels were widely distributed along the Continental Divide, throughout much of the northern Appalachian States, and in coastal regions of several southeastern States.

1973 to 1974 Population Changes

The United States BDI increased 4.5%, from 18.6 doves heard per route in 1973 to 19.4 doves heard per route in 1974 (Table 1). Population indices increased in physiographic regions (Fig. 2) totaling 50% of the U.S. land area, decreased in 47% of the land area, and showed no change in 3% of the land area. Regions in which the population indices increased had lower mean values than regions in which the population indices decreased. This phenomenon was also evident in 1973 (Ruos 1974b). Changes greater than 10% in the BDI are illustrated by State (Fig. 5) and physiographic region (Fig. 6). The index increased in many of the western States, in the coastal plain of Texas and Louisiana, and in several regions east of the Appalachians. Population indices decreased in widely scattered areas of the southeastern, north-central, and southwestern States. From 1973 to 1974, the combined hunting States index increased 6.4%, and the combined nonhunting States index decreased 0.6%.

Analyses of several factors associated with the 1973 and 1974 surveys revealed no important yearly differences in mean survey date, temperature at the start of the survey, or the percentage of survey stops with disturbance great enough to jeopardize the audibility of calling doves (Table 2). In 1974 about 9% of the survey route stops were subject to high disturbance.

1964 to 1974 Long-term Population Trends

The 1974 indices for the United States, the combined hunting States, and combined nonhunting States are above their record lows established in 1970 and 1971. The 1974 population index for the United States was 1.0% below its preceding 10-year mean of 19.6 doves heard per route (Fig. 7). The current
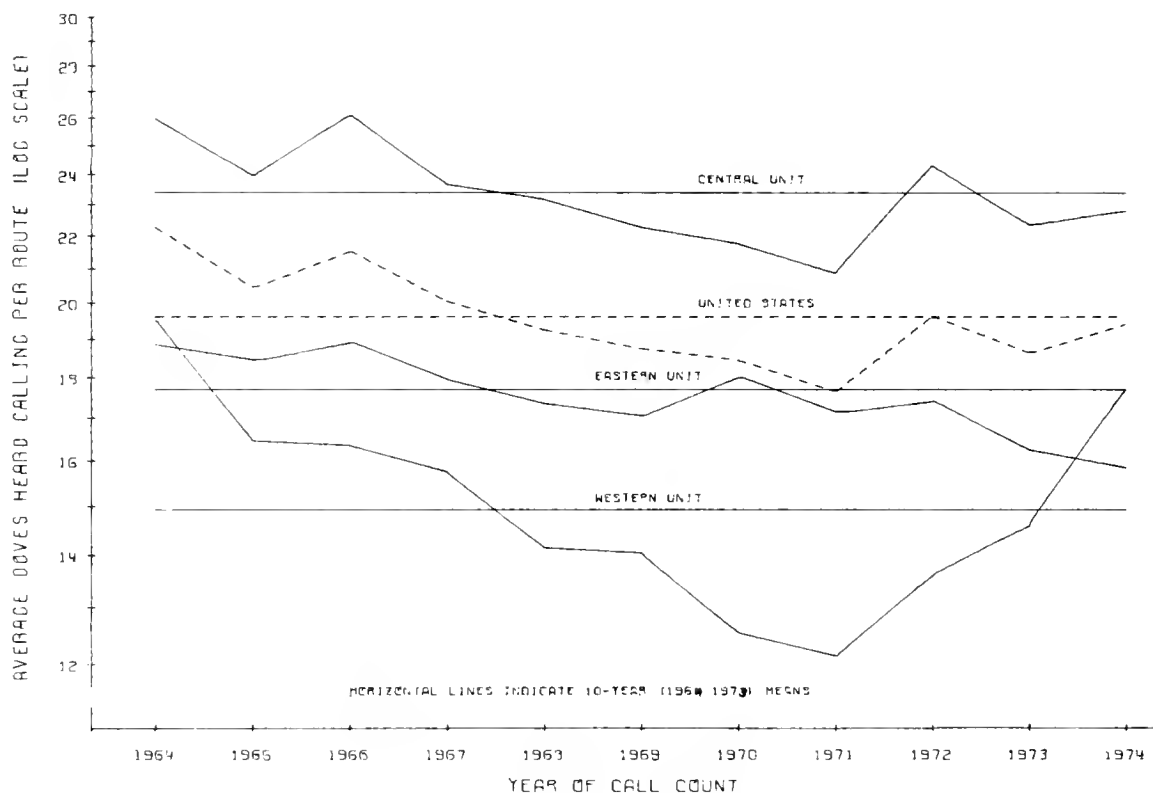
Fig. 7. Population indices of breeding mourning doves by management unit, 1964-74.
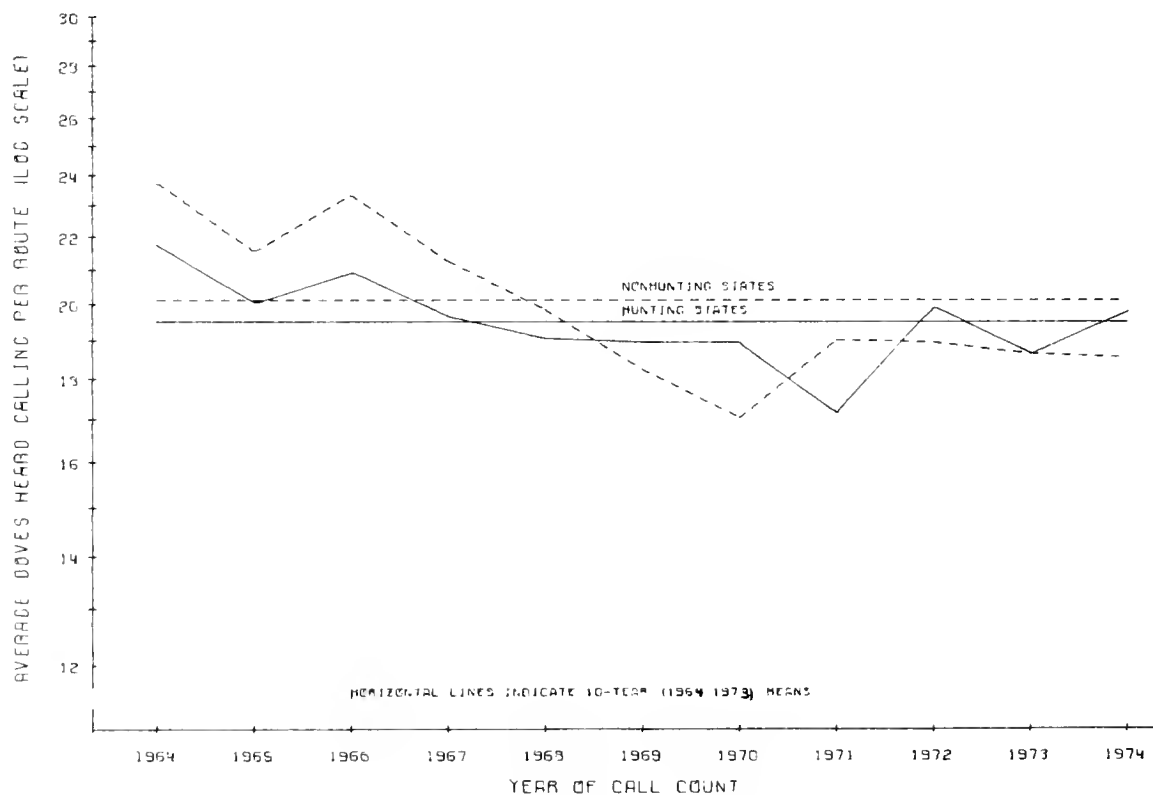
Fig. 8. Population indices of breeding mourning doves in hunting and nonhunting States, 1964-74.
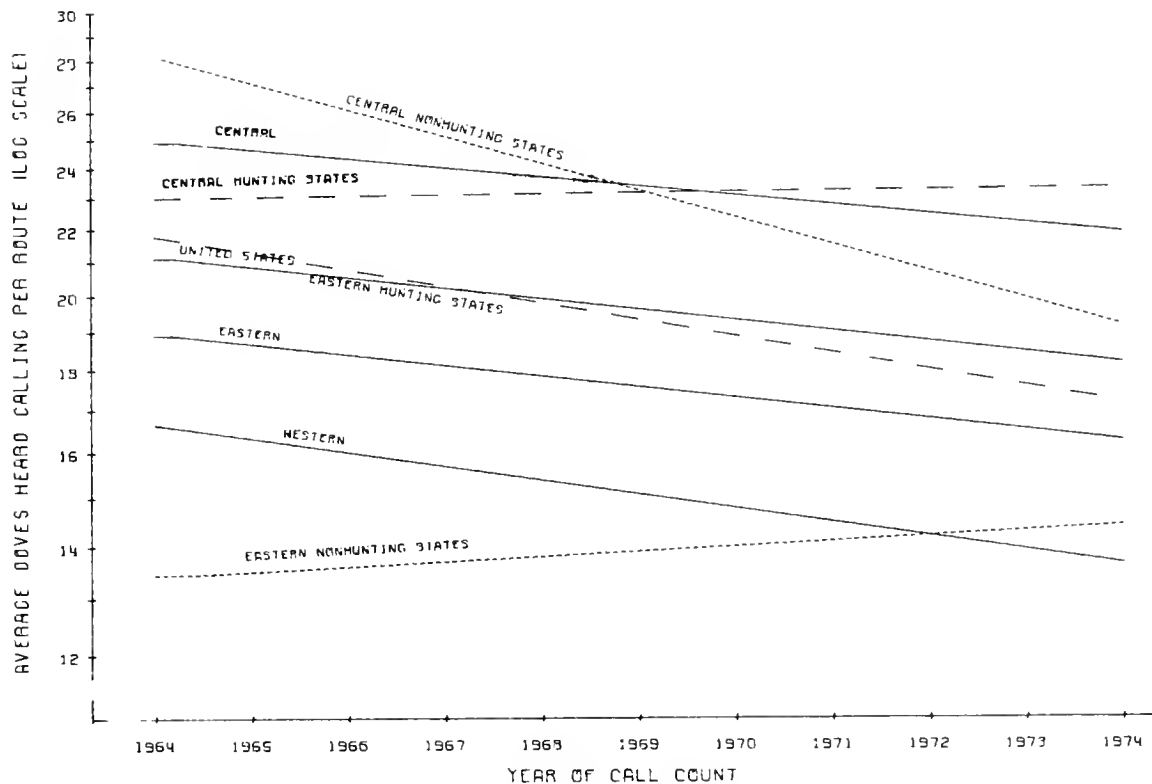
Fig. 9.   Linear regression lines of mourning dove call-count data, 1964-74.
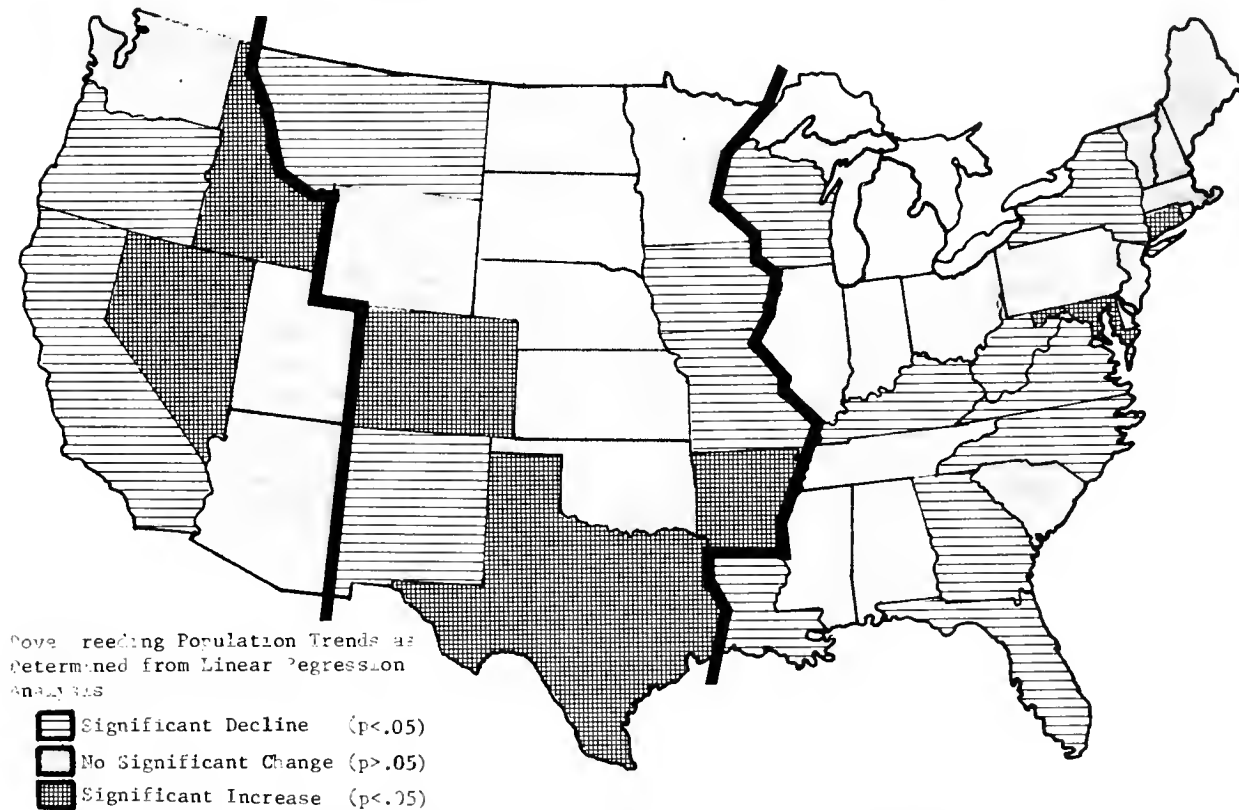
Fig. 10.   Trends in mourning dove breeding populations by State, 1964-74.

Dove Breeding Population Trends as
Determined from Linear Regression
Analysis

☐ Significant Decline   (p<.10)
☐ No Significant Change (p>.10)
☐ Significant Increase   (p<.10)
☐ Insufficient Data
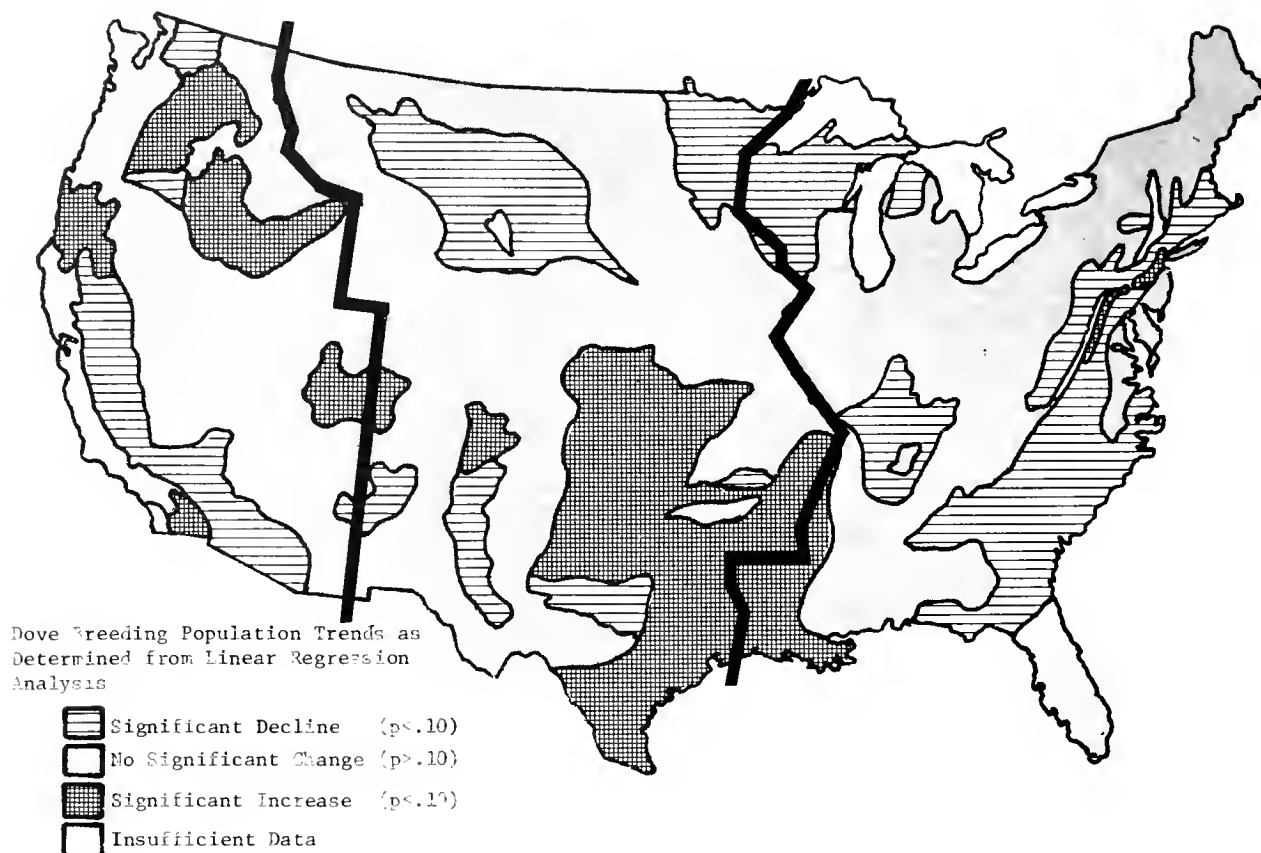
Fig. 11. Trends in mourning dove breeding populations by physiographic region, 1965-74.

combined nonhunting States index was also below its mean by 8.0%, whereas the combined hunting States index was 1.5% above its long-term mean (Fig. 8).

Adjusted BDI's plotted in Figs. 7 and 8 reflect the trend in population indices since 1964. Linear regression analyses of these data (Table 3) are shown in Fig. 9. The incides declined at an average annual rate of 1.5% in the United States, 1.1% in the hunting States, and 2.6% in the nonhunting States. This study reveals a significant overall decline in nationwide dove breeding population between 1964 and 1974.

Regression analyses of State values for the 11-year period showed seven States (21% of the land area) with significant upward trends in the population index, compared with 16 States (35% of the land area) with downward trends (Table 3, Fig. 10). A similar study of physiographic region data from 1965 to 1974 is also presented in Table 4 and Fig. 11. Population indices have been increasing over a broad area from the southern Great Plains to the Gulf Coast of Texas and Louisiana. Declining trends were prevalent east of the Appalachians, in the northern Great Plains, and in several regions of the Pacific coastal States.

Status of the Eastern Management Unit Population

The Eastern Management Unit consists of 27 of the 48 contiguous States, including 30% of the land area and 24% of the current dove breeding population in the country. In the Eastern Unit, dove hunting is permitted in 16 States representing 66% of the land area and 73% of the estimated dove population. In 1974 the mean breeding population index was 15.7 doves heard per route for the Unit, with 17.5 doves heard per route for the combined hunting States and 12.3 doves heard per route for the combined nonhunting States (Table 1).

1974 Population Distribution

Extensive areas of high dove densities were reported from the Interior Plains (Regions 111, 124), Mississippi Alluvial Plain (Region 035), and Upper Atlantic Coastal Plain (Region 032). States with a mean of 30 or more doves heard per route included Indiana, Mississippi, and South Carolina (Table 3,

Fig. 3). Densities were generally low in the Appalachian Highlands, northern uplands, and the lower Atlantic Coastal Plain (Table 4, Fig. 4). Two Gulf Coastal States and nine northern States had means of fewer than 10 doves heard calling per route in 1974.

1973 to 1974 Population Changes

The Eastern Unit BDI decreased 3.1% from 16.2 doves heard per route in 1973 to 15.7 doves heard per route in 1974 (Table 1). Population indices increased in those physiographic regions (Fig. 1) representing 25% of the total land area, decreased in 70% of the area, and showed no change in 5% of the area. The most extensive area of increase was in those regions east of the Appalachians, particularly in the States of Connecticut, Georgia, Rhode Island, and Virginia. Substantially lower population indices occurred in portions of the Gulf and Atlantic Coastal Plains, and in Wisconsin (Figs. 5, 6). From 1973 to 1974 the combined hunting States index decreased 0.6% and the combined nonhunting States index decreased 9.9% (Table 1).

The mean survey date was 25 May in 1974 and 28 May in 1973 in the Eastern Unit (Table 2). In 1974 the mean temperature at the start of the survey was 1.1 C warmer than in the previous survey year. There was no important difference in the percentage of high disturbance recorded per route between 1973 and 1974. The Eastern Unit had the greatest proportion of survey route stops affected by high disturbance (11.4%) of any unit in 1974.

1964 to 1974 Long-term Population Trends

The 1974 population indices were the lowest in 21 years for both the Eastern Unit and the combined hunting States. The 1974 index for the combined nonhunting States was the lowest since 1965. All current indices were below their preceding 10-year means, the Eastern Unit index by 11%, the combined hunting States index by 11%, and the combined nonhunting States index by 12% (Table 3, Figs. 7, 12). The negative departure of the 1974 index from the long-term mean was greater in the Eastern Unit than in the Central or Western Unit.

Regression analysis shows a significant downward trend in the Eastern Unit population index between 1964 and 1974; the mean rate of decline was 1.5% per year (Table 3, Fig. 9). During the same period the combined hunting States index declined at a mean annual rate of 2.3%, whereas the combined nonhunting States index increased at 0.7% per year. Long-
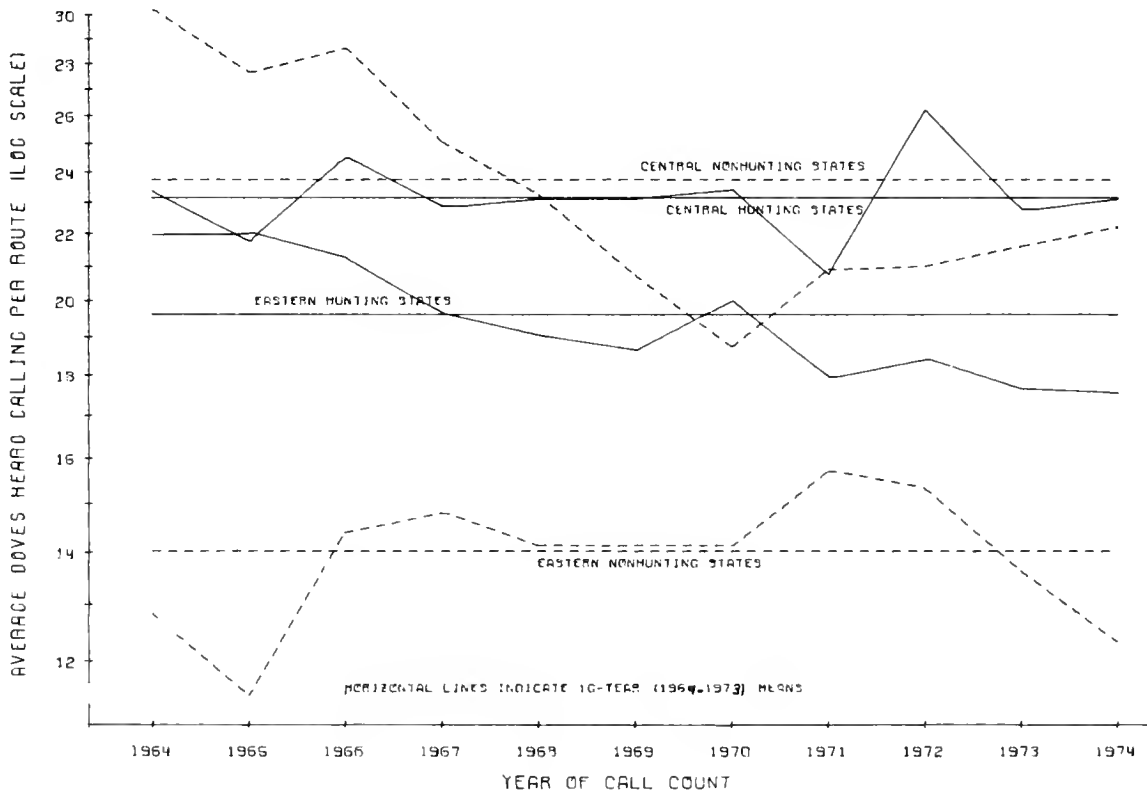
Fig. 12. Population indices for breeding mourning doves in the Eastern and Central Management Unit hunting and nonhunting States, 1964–74.

term trends by State and physiographic region are shown in Figs. 10 and 11. Only 2 States (2% of the Unit's land area) had statistically significant upward index trends, compared to 10 States (45% of the area) with downward trends. Population indices declined in all sections of the Eastern Management Unit. A significant increase in the index· (48% from 1972 to 1974) occurred in the Piedmont Upland (Region 041) for the second consecutive year (Table 4).

Status of the Central Management Unit Population

The Central Management Unit consists of 14 of the 48 contiguous States, including 46% of the land area and 54% of the current breeding population in the country. Within the Central Unit, dove hunting is permitted in eight States representing 63% of the land area and 64% of the estimated dove population. In 1974 the mean breeding population index was 22.8 doves heard per route for the Unit; it was 23.1 doves heard per route for the combined hunting States and 22.2 doves for the combined nonhunting States (Table 1).

1974 Population Distribution

Extensive areas of high dove densities were reported from the southern portion of the Great Plains and over much of the Central Lowlands (Regions 126, 135, 137). States represented by a mean of 30 or more doves heard per route included South Dakota, Nebraska, Kansas, and Oklahoma (Table 3, Fig. 3). Densities were generally low throughout much of the Rocky Mountain States (Table 4, Fig. 4). Montana and New Mexico had a mean lower than 10 doves heard per route in 1974 (Table 4, Fig. 4).

1973 to 1974 Population Changes

The Central Unit population index increased 2.2% from 22.3 doves heard per route in 1973 to 22.8 doves heard per route in 1974 (Table 1). Changes greater than 10% in the breeding index are portrayed by State (Fig. 5) and physiographic region (Fig. 6). The index increased in extensive areas of the Gulf Coastal Plain of Texas and in the northwest along the Rocky Mountains and adjacent Great Plains. Areas showing index decreases greater than 10% include the east-central and southwestern portions of the Central Unit. From 1973 to 1974, the combined hunting States and combined nonhunting States indices increased by 1.8 and 3.0%, respectively.

No important differences in survey dates and mean survey temperatures occurred between 1973 and 1974. The 1974 survey, however, was associated with less high-disturbance along survey routes than in the preceding year (Table 2).

1964 to 1974 Long-term Population Trends

The Central Unit BDI increased in 2 of the last 3 years (Table 3, Fig. 7) for the first time since 1966. This evidence provides some support to the contention that Unit populations may be recovering from the 11-year decline ending in 1971. The current population index is 3% below its preceding 10-year mean of 23.4 doves heard per route (Fig. 7). Since 1964 the combined hunting States indices have remained nearly stable; the 1974 index was less than 1% below its long-term mean (Table 3, Fig. 12). The current combined nonhunting States index is 7% below the 1964–73 long-term mean, but, following four consecutive years of increase, it is 19% above its lowest point in 1970.

Regression analysis shows that a significant downward trend in breeding population indices occurred from 1964 to 1974 in the Central Unit. A similar downward trend was observed for the combined nonhunting States. No significant trend in the population indices was shown for the combined hunting States (Table 3, Fig. 9). Annual rates of change in the BDI's were determined as follows: Central Unit, down 1.3%; combined hunting States, up 0.2%; and combined nonhunting States, down 3.8%. The annual rate for nonhunting States represents the greatest rate of decline of any unit or subunit. Long-term trends by State and physiographic region are shown in Figs. 10 and 11. Three States (31% of the Unit's land area) have statistically significant upward population trends, compared with four States (29% of the area) with downward trends. Increasing trends were most prevalent in the central and southeastern portions of the Unit. A significant decrease in the index occurred in the Dissected Till Plains (Region 125) for the second consecutive year. This important region's index declined 34% from 1972 to 1974 (Table 4).

Status of the Western Management Unit Population

The Western Management Unit is composed of 7 of the 48 contiguous States, including 24% of the land area and 22% of the current breeding population in the country. All States in the Western Unit permit the hunting of doves. In 1974 the mean breeding population index was 17.7 doves heard per route (Table 1).

1974 Population Distribution

The highest population indices of mourning doves in the Western Unit were generally restricted to the Sonoran-Mojave Desert and adjacent areas (Regions 222, 223). Two States, Arizona and Idaho, had a mean of 20 or more doves heard per route (Figs. 3, 4). Indices

were low throughout much of the Great Basin and Rocky Mountains.

1973 to 1974 Population Changes

The Western Unit BDI increased 21.2% from 14.6 doves heard per route in 1973 to 17.7 doves heard per route in 1974 (Table 1). Population indices increased between 1973 and 1974 in physiographic regions (Fig. 2) representing 74% of the land area; they decreased in 19% of the area and did not change in the remaining 7% of the land area. The increases were important, if not spectacular, throughout most of the Unit (Figs. 5, 6). The current indices are above those of 1973 in all States except Arizona.

Analyses show no important differences between 1973 and 1974 in the mean survey date or in the extent of high disturbance along routes (Table 2). The mean temperature at the start of the 1974 survey was 1.1 C cooler than in 1973.

1964 to 1974 Long-term Population Trends

The population index for the Unit in 1974 was 18.8% above its preceding 10-year mean of 14.9 doves heard per route (Fig. 7). Since the record low index was established in 1971, the Unit's population index has increased a total of 46.3% (Table 3). Linear regression analysis of data from 1964 to 1974 shows a downward population index trend, with an annual rate of decline of 2.0%. Study of these long-term data shows two distinct trends. From 1964 to 1971, Unit population indices fell during each of seven consecutive years at an average rate of 5.6% per year. From 1971 to 1974, the indices increased during each of the three consecutive years at an average annual rate of 13.2% This phenomenon has not received adequate study.

From 1964 to 1974, the population indices showed a significant upward trend in Idaho and Nevada, which contain 27% of the Unit's land area; the trends were downward in California and Oregon, which make up 36% of the area (Table 3, Fig. 10).

Statistical Significance of Data

1973 to 1974 Population Changes

A significant ($P < 0.05$) increase occurred in the BDI of the Western Management Unit between 1973 and 1974 (Table 1). None of the indices for the other units or their combined hunting States or combined nonhunting States differed significantly ($P < 0.05$) between these years. Although not designed to detect population changes within States, the survey showed significant ($P < 0.05$) increases in Virginia and Wyoming. Significant ($P < 0.05$) decreases did not occur in any State between 1973 and 1974.

A study of physiographic region data within management units revealed a significant ($P < 0.05$) increase from 1973 to 1974 in the BDI of the Piedmont Uplands (Region 041) in the Eastern Unit (Fig. 1). From 1973 to 1974, significant decreases occurred in the Dissected Till Plains (125) and the Ouachita Mountains (152) in the Central Unit. In the Western Unit, the population index for Region 214 in northeastern Arizona decreased between 1973 and 1974.

The analyses of several factors associated with the Call-Count Survey showed that the Survey was run significantly earlier and under significantly warmer conditions in 1974 than in 1973 in both the Eastern Unit and the combined hunting States of this Unit (Table 2). Surveys were conducted earlier in 1974 than in 1973 in the United States and in the combined hunting States of the United States. No other statistically significant ($P < 0.05$) differences occurred between years for any unit or subunit in the analysis of mean survey date, temperature at start of survey, or percentage of high disturbance along survey routes.

1964 to 1974 Long-term Population Trends

Linear regression analyses of the 1964–74 data revealed significant ($P < 0.05$) downward trends in BDI's for the Eastern, Central, and U.S. Units, as well as for the combined hunting States of the Eastern Unit, combined nonhunting States of Central Unit, and combined nonhunting States of the United States (Table 3). No significant trend was established for the Western Unit, the combined nonhunting States of the Eastern Unit, the combined hunting States of the Central Unit, or the combined hunting States of the United States. Although no 11-year trend was determined for the Western Unit, the data from 1964 to 1971 was represented by a significant ($P < 0.05$) downward trend, and data from 1971 to 1974 by a significant upward trend.

Analyses of long-term data by State (Table 3) revealed that seven States representing 21% of the Nation's land area had significant ($P < 0.05$) upward population trends between 1964 and 1974. Sixteen States, totaling 35% of the land area, had significant long-term downward population trends (Table 3, Fig. 10). From 1965 to 1974, 13 of 79 physiographic regions, comprising 18% of the total land area, had significant ($P < 0.10$) upward trends, and 19 regions, encompassing 23% of the land area, had significant ($P < 0.10$) downward trends (Table 4, Fig. 11). For the second consecutive year, the population index for Region 041 increased significantly ($P < 0.05$), and the index for Region 125 decreased.

Acknowledgments

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